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**Subject: Outbreak of Shiga toxin-producing *E. coli* (STEC) infections associated with a livestock building at the North Carolina State Fair – Raleigh, North Carolina, October 2011.**

## BACKGROUND

Shiga toxin-producing *Escherichia coli* (STEC) O157:H7 is a gram negative bacterium that causes approximately 73,000 illnesses and 61 deaths each year in the United States. (1) In North Carolina, STEC caused 113 reported illnesses in 2010, with an average of 132 illnesses per year over the past five years. (2) (Table 1) Infection with STEC can lead to nausea, vomiting, and bloody diarrhea. In up to 20% of children, STEC can lead to hemolytic uremic syndrome, a serious complication that can result in renal failure, dialysis and death. (3) STEC is typically found in the intestinal tract of ruminants (e.g. sheep, goats) and has been associated with undercooked ground beef, produce and raw milk. (1)

On October 24, 2011, the North Carolina Division of Public Health (NCDPH) was notified of four residents of Wake County infected with STEC. On October 25, one additional case was confirmed; two of the five patients were hospitalized with hemolytic-uremic syndrome (HUS). All five patients had attended the 2011 North Carolina State Fair, held October 13–23 in Wake County. Over 1 million visitors were estimated to have attended the fair.

## **MATERIALS AND METHODS**

### **Initial Public Health Response**

Given the potential for a large STEC outbreak among State Fair attendees, the NCDPH Public Health Command Center (PHCC) was activated October 25, 2011 to provide assistance to the Wake County Health Department. PHCC activation provides dedicated staff in planning, logistics, operations, administration and finance within the incident command system. A daily schedule was instituted with 9am staff briefings, 11am conference calls to update local health departments, 3pm situation reports and 4pm daily summaries. A secure, internet-based crisis information management system (WebEOC) was activated to serve as an online repository for reports, communication and documentation.

### **Case finding and hypothesis generation**

Active case finding was performed to determine the extent of the outbreak. On October 25, 2011 a network of hospital-based public health epidemiologists began active surveillance for cases among persons diagnosed or treated in any of the 10 largest healthcare systems in North Carolina<sup>1</sup>. To enhance reporting, the state laboratory of public health (SLPH) sent an alert to all microbiology laboratories in North Carolina; local health departments were notified through an NC HAN alert; and North Carolina healthcare providers received a memo from the State Epidemiologist regarding the identification, management and reporting of *E. coli* O157 infections. (Appendix A) On October 26, 2011 an Epi-X notification was sent to public health officials across the United States. Information regarding the outbreak and the investigation was provided to the local media, posted on the NC DPH website, and distributed to local health departments. Daily media updates were provided for the duration of the outbreak.

The initial five case-patients were interviewed by Wake County Health Department using the NCDPH STEC Confidential Communicable Disease Reporting Form Part 2. (4) All case-patients reported travel to or residence in Wake County and all had attended the 2011 North Carolina State Fair. Based on this information, a broad case definition was developed on October 26, 2011:



**Case** – Acute bloody diarrhea, laboratory evidence of STEC (isolation of shiga toxin-producing *Escherichia coli* O157:H7 from culture or identification of shiga toxin in a stool specimen by enzyme-linked immunosorbent assay), or diagnosis of hemolytic uremic syndrome (HUS) in a person who resided in or traveled to Wake County on or since 10/06/11.

By October 26, 2011, 9 cases had been identified. The only common exposure was attendance at the 2011 NC State Fair. No common food exposures, travel history, or other activities were found. A case control study was planned, and a questionnaire specific to the 2011 NC State Fair was developed. On October 27, 2011, 21 cases had been identified and it was evident that the outbreak extended beyond Wake County. Investigative lead was transferred from Wake County to NC DPH. The final case definition, developed on November 2, included categories for confirmed, probable and suspect cases:

**Confirmed:** Laboratory evidence of STEC (as defined above) or hemolytic uremic syndrome (HUS)\*\*

**Probable:** A clinically compatible illness in a person who is epidemiologically linked to a confirmed case.

**Suspect:** Acute bloody diarrhea in the absence of a different confirmed diagnosis\*\*

\*\*in a person with onset of symptoms between 10/13/2011 and 11/2/2011 who attended the state fair during the 1–10 days prior to symptoms.

### **Clinical Laboratory investigation**

On October 25, 2011, the North Carolina State Laboratory of Public Health (SLPH) received the first STEC isolates for confirmatory testing and characterization. As additional cases were identified, isolates and clinical specimens were collected and forwarded to SLPH for further testing.

In order to isolate and identify STEC from stool samples, SLPH performed cultures on selective and non-selective media with subsequent confirmatory testing. DNA fingerprinting using pulsed field gel electrophoresis (PFGE) and multiple-locus variable number tandem repeat analysis (MLVA) were conducted on STEC isolates. PFGE results were compared to isolates in the national PulseNet database to identify similar patterns occurring elsewhere<sup>2</sup>.

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<sup>1</sup> Additional information at: <http://epi.publichealth.nc.gov/phpr/phe.html>

<sup>2</sup> Additional information at: <http://www.cdc.gov/pulsenet/>



## **Environmental Investigation**

The 2011 State Fair ended on October 23, 2011; the vendors had dispersed and the fairgrounds had been cleaned prior to this investigation. On October 25, Wake County Health Department and Environmental Services collected 12 random samples of animal stool from the petting zoo, the sheep and goat tents, the Expo Building, the Graham Building, and the Children's Barnyard. These were stored by Wake County Environmental Services then tested at SLPH. After an initial review of case-control data (see below), NCDPH performed a site visit along with representatives from the NC Department of Agriculture and Consumer Services (NCDA&CS) on November 17, 2011 to review the layout of the implicated venue, including the location of animals, signage and hand hygiene facilities.

## **Case-Control Study**

NCDPH initiated a case-control study on October 27 to identify exposures associated with illness. To identify controls, 31,110 email addresses of online advance ticket purchasers were provided by the fair vendor. These email addresses were randomized using Microsoft Excel. Eleven thousand individuals were sent an email with a request to participate in the study (Appendix B). The email also contained a link to a press release on the NCDPH website and provided a phone number where individuals could listen to a recorded message from the State Epidemiologist. The email provided a link to a six question survey (SurveyMonkey.com, LLC Copyright © 2010) which assessed willingness to participate in the case-control study, ages of persons who attended the fair ( $<18$ ,  $\geq 18$ ), and date of fair attendance. (Appendix C) Survey responses were downloaded to a Microsoft Excel spreadsheet, and three controls were matched to each case by age category and date of fair attendance. All cases and controls were interviewed by phone or in person, using a scripted questionnaire. Cases and controls less than 18 years of age were interviewed with a parent or guardian present. For children too young to answer questions themselves, the parent or guardian was interviewed about the child's activities.

NCDPH partnered with NCDA&CS to obtain a list of vendors, food products, animal exhibitions, rides and activities. Maps of the State Fair layout and a schedule of events were also obtained. The 21 page questionnaire asked detailed questions about fair activities, food and beverage consumption, and animal exhibits. It also assessed pre-existing conditions, medication usage, attitudes about animal exhibits, and knowledge and beliefs about hand-washing. (Appendix D)



## Statistical Analysis

The questionnaire responses were entered into a Microsoft Access database. Analyses were performed using SAS 9.2 (SAS Institute Inc. Cary, North Carolina). Matched odds ratios were calculated using the Cochran–Mantel–Haenszel method and a 95% confidence interval.

## RESULTS

### Description of Case-Patients

Twenty-five case patients from seven counties were identified with illness onsets during October 16–25. (Figure 1) Of the 25, 12 (48%) were confirmed cases, 10 (40%) were suspect, and 3 (12%) were probable. Fifteen case patients were female (60%) and 10 (40%) were male. The median age among case-patients was 26 years (range: 1–77 years) with 10 case-patients (40%) less than 18 years of age.

The average duration of illness was 7 days (range: 3–12). The most common symptoms reported were diarrhea (100%), abdominal cramps (96%), bloody diarrhea (92%), and nausea (60%). Other symptoms included vomiting, fever, chills, headache, myalgias, fatigue and constipation. Diarrhea lasted an average of 7 days (range: 1–12 days), with a median of 7 stools per day at the height of illness (range: 3–45). Bloody diarrhea lasted an average of 4 days (range: 1–9 days). Fifty-two percent of cases experienced a fever ranging from 100–102 degrees Fahrenheit during their illness. (Table 2)

Sixteen cases (64%) visited a health care provider at least once during their illness. The average number of visits to a healthcare provider was 2 (range: 0–5 visits). Five cases (20%) were treated with antibiotics. Eight (32%) case-patients were hospitalized with mean hospital duration of 9 days (range: 1–22 days). Five (63%) of the hospitalized cases were under 18 years of age. Four children (16%) developed HUS. Three of these children required dialysis with a median dialysis duration of 13 days (range: 8–16 days). (Table 2)

The dates of fair attendance spanned from October 13 (opening day) through October 22. Seventeen case-patients (68%) visited the State Fair during the first three days, including all 12 of the confirmed cases. Illness onset dates ranged from October 16–October 25. The median interval from first day of fair attendance to onset of illness was 4 days (range: 1–11 days). (Figures 2-3)



## **Clinical Laboratory Results**

Nineteen case-patients provided stool samples. Fifteen of these samples were tested at SLPH. The remaining four were reported negative at local laboratories. *E coli* O157:H7 with shiga toxin type 2-production was confirmed in 11 of the 15 samples submitted to SLPH; the remaining four samples were negative for STEC. PFGE and MLVA testing of the 11 STEC isolates revealed a high degree of genetic similarity. (Table 3) The PFGE pattern identified is the 8<sup>th</sup> most commonly identified pattern in PulseNet and has previously been implicated in outbreaks involving ground beef, Lebanon Bologna, wild game, and frozen pepperoni pizza. (5)

## **Environmental Laboratory Results**

No evidence of STEC was identified in any of the twelve animal stool samples collected at the fairground on October 25.

## **Case-Control Study**

All 25 cases were interviewed with the standard scripted questionnaire. Of the 11,000 fair attendees emailed to solicit controls, 2,318 responded to the survey (21% response rate). Of these, 1,345 agreed to participate in the study and provided contact information, age categories for fair attendees in their group (<18, ≥ 18), and dates of fair attendance. Seventy-seven controls were enrolled, providing a 3:1 ratio of controls to cases. Case and control interviews were completed October 28—November 8, 2011.

(Figure 4)

Cases and controls were similar with regard to age, sex, race, county of residence, daycare attendance and school attendance. (Table 4). There were no significant differences in pre-existing conditions, usage of immunosuppressive medications, or antibiotics. Cases and controls held similar beliefs about the importance of hand washing and also expressed similar attitudes towards animal exhibits at fairs.

(Table 5)

Illness was not associated with any specific exposures to foods or beverages, land rides, water features (i.e. lake, Dorton fountain) or water rides. Nineteen different animal exhibits and competitions were evaluated. The petting zoo and other exhibits in which animals were intended for human contact were not associated with illness. Among all exposures assessed, visiting the Kelley Building was most strongly



associated with illness (67% of case-patients vs. 28% of controls, matched odds ratio: 5.6; 95% CI: 1.6–19.2). The Kelley Building is one of the permanent buildings where sheep, goats, and pigs were housed for junior livestock competitions. The Kelley Building was used for livestock competitions on the first three days of the fair, then was emptied and cleaned before hosting further competitions. Animals in the building were not intended to have physical contact with fair visitors. (Table 6)

Among visitors to the Kelley Building, case-patients were generally more likely to report touching rails around the animals or having contact with animal manure than controls. (Table 7) However, these associations were not statistically significant. The length of time spent in the Kelley Building was similar among case-patients and controls. (Figure 5)

Visiting the sheep and goat tent adjacent to the Kelley building was also associated with illness (matched odds ratio: 4.4; 95% CI: 1.2–16.5). However, only 33% of case-patients reported visiting the tent and all of those persons had also visited the Kelley Building. (Table 6)

Exhibiting animals at the fair was associated with illness (matched odds ratio: 10.2; 95% CI: 2.1–51.1); however only six (24%) of case-patients reported this exposure and all were part of a single family cluster. When this family cluster was removed from the analysis, exhibiting animals at the fair was no longer associated with illness.

## **CONCLUSIONS**

Our investigation indicates that this outbreak was associated with STEC exposures occurring at a single venue at the 2011 North Carolina State Fair. The Kelley Building housed ruminants, which are known to carry and sporadically shed STEC. On November 10, 2011, NCDPH and NCDA&CS held a joint press conference to announce the Kelley Building as the source of the outbreak.

## **Limitations**

Our case definition only included persons with laboratory evidence of STEC or more severe manifestations of infection (i.e. bloody diarrhea or HUS). This may have excluded individuals who had less severe presentations of STEC infection. As a result, the final case count may be an underestimate of the total number of STEC cases associated with this outbreak.



Controls were selected only among persons who had purchased fair tickets online and in advance. It is possible that individuals who purchase advance tickets online may have different behaviors than the general population of fair attendees. However, behaviors related to hand washing and hand hygiene were assessed and found to be similar among cases and controls.

Responses from case-patients and controls may have been affected by recall bias, as interviews were conducted 1–2 weeks after the State Fair. However, non-differential recall bias would likely bias estimates of association towards the null and therefore have no effect on our conclusion that visiting the Kelly Building was associated with illness.

## **DISCUSSION**

A previous STEC outbreak linked to a petting zoo at the 2004 North Carolina State Fair resulted in 187 illnesses, 15 (8%) of which were complicated by HUS (6). The 2004 outbreak led to the passage of Aedin's Law, which created regulations for exhibitions housing animals intended for physical contact with the public (7). These regulations include requirements for permitting, education and signage to inform the public of health and safety issues, enhanced maintenance of animal facilities, transitional entrances and exits, and easily accessible hand-washing stations (7). The 2011 outbreak was associated with an animal exhibit which was not subject to Aedin's Law, although preventive measures were in place based on national guidelines compiled in the 2011 Compendium of Measures to Prevent Disease Associated with Animals in Public Settings. (8) Specific guidelines outlined in the 2011 Compendium include the following:

1. Facility Design – Limit contact with manure and maximize hand washing.
  - a. Double barriers to reduce contact with animals and manure.
  - b. Signage warning of the risk of disease transmission and encouraging hand washing.
  - c. Signage encouraging use of soap and water instead of hand sanitizer when hands are visibly soiled.
  - d. Hand washing stations at the entrance and exit of all exhibits.
  - e. Separate areas designated as non animal areas, transition areas and animal areas.
2. Non animal areas
  - a. Animals (except service animals) not permitted.
  - b. Prepare serve and consume food only in these areas.





- c. Easily accessible and encouraged hand washing stations.
- 3. Transition areas
  - a. Single flow of pedestrian traffic with specific entrance and exits.
  - b. Signage at entrance warning of risk of disease transmission and discouraging eating, drinking, pacifier use, or stroller use.
  - c. Signage and verbal announcements at exit encouraging hand washing with soap and water. Easily accessible and visible hand washing stations.
- 4. Animal areas
  - a. Food and beverages prohibited.
  - b. No strollers, pacifiers, sippy cups or baby bottles.
  - c. Regular and prompt cleaning of manure or other animal soilage.
  - d. Do not transport manure or soiled bedding through transition or non animal areas.
  - e. Disinfect animal areas once daily.
  - f. Allow proper ventilation.

## **RECOMMENDATIONS**

To prevent future outbreaks, the guidelines compiled in the 2011 Compendium of Measures to Prevent Disease Associated with Animals in Public Settings should be followed for all livestock exhibitions where physical contact with the public might occur, whether intended or not. A multiagency task force is being created in North Carolina to evaluate the preventive measures that were in place during the 2011 State Fair and to identify additional interventions that may be applied to prevent disease transmission during animal exhibits not intended for human contact.

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Table 1: STEC infections reported to NC EDDS in North Carolina for the past five years.

NC EDDS Epi Case Count CD

Disease	Year	Total	Month											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
E. coli - shiga toxin producing (53)	2007	153	6	8	2	10	20	25	23	16	13	18	5	7
	2008	152	8	3	6	12	18	17	19	14	16	27	8	4
	2009	110	16	4	7	8	11	15	5	7	17	9	9	2
	2010	113	2	2	1	12	9	12	15	13	8	21	7	11
	2011 (YTD)	134	7	5	7	7	12	15	17	14	9	38	3	0
<b>Totals</b>		<b>662</b>	<b>39</b>	<b>22</b>	<b>23</b>	<b>49</b>	<b>70</b>	<b>84</b>	<b>79</b>	<b>64</b>	<b>63</b>	<b>113</b>	<b>32</b>	<b>24</b>

Figure 1: Distribution of Cases by County of Residence.

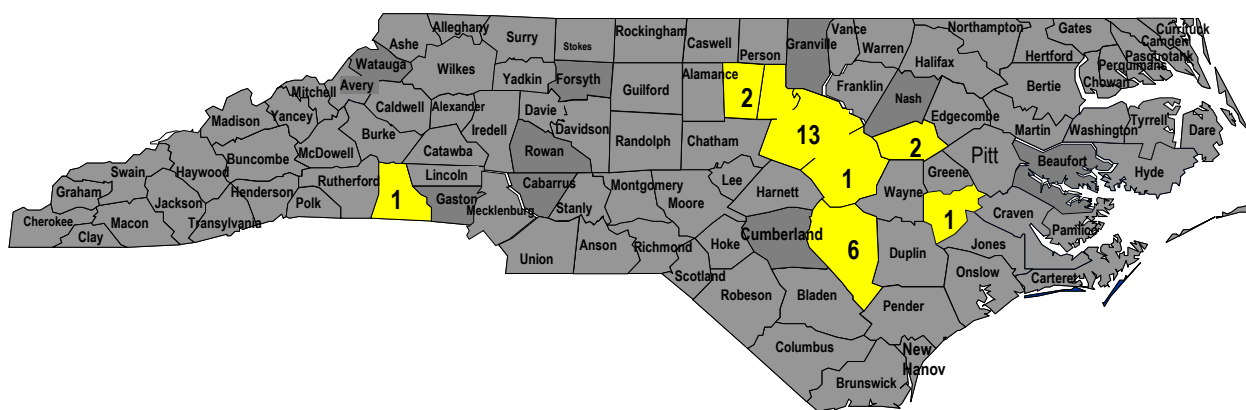


Table 2: Clinical Manifestations among Case-Patients (N=25)

<b>Symptoms</b>	<b>#</b>	<b>%</b>
Diarrhea	25	100
Abdominal Cramps	24	96
Bloody Diarrhea	23	92
Nausea	15	60
Fever	13	52
Vomiting	11	44
HUS	4	16
<b>Hospitalization for this illness</b>	<b>#</b>	<b>%</b>
Ever Hospitalized	8	32
Never Hospitalized	17	68
Currently Hospitalized	0	0
Range (days)	1 to 22	
Average (days)	9	
<b>Hospitalized by Age Strata</b>	<b>#</b>	<b>%</b>
<18 yrs Hospitalized	5	63
> 18 yrs Hospitalized	3	37
<b>Hemolytic Uremic Syndrome (n=4)</b>	<b>#</b>	<b>%</b>
Required Dialysis	3	75
Range (days)	8 to 16	
Average (days)	12.3	



Figure 2: Date of State Fair Attendance of Cases, Stratified by Confirmed, Suspect and Probable

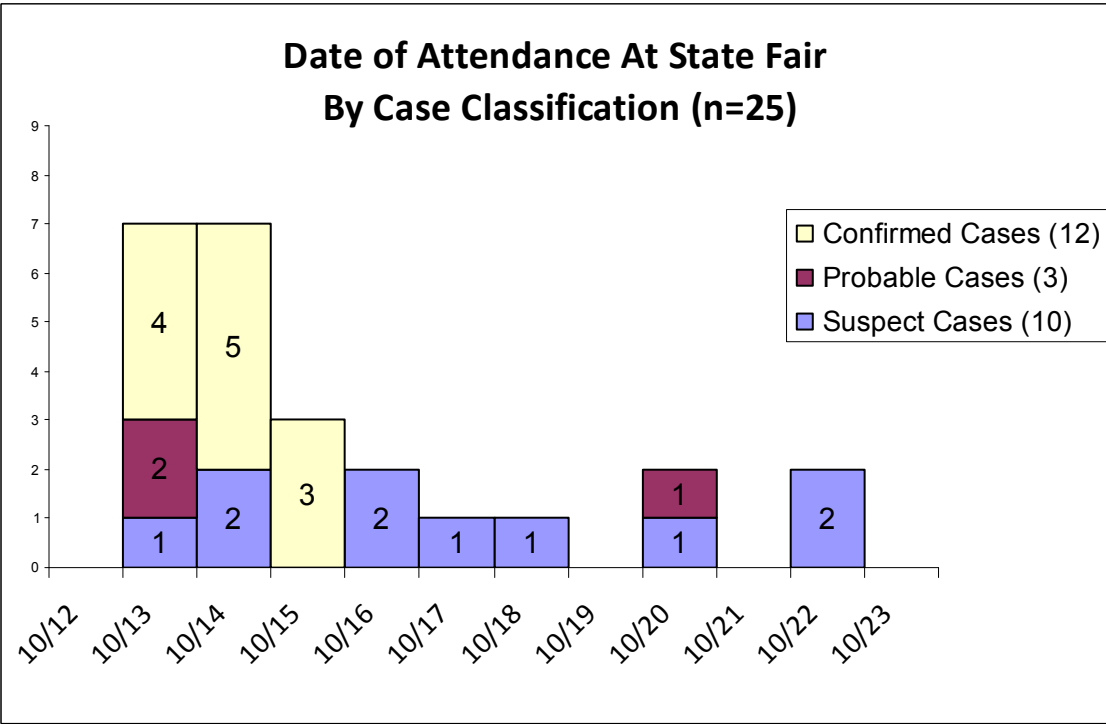


Figure 3: Epidemic Curve by Date of Illness Onset, Stratified by Confirmed, Suspect and Probable Cases

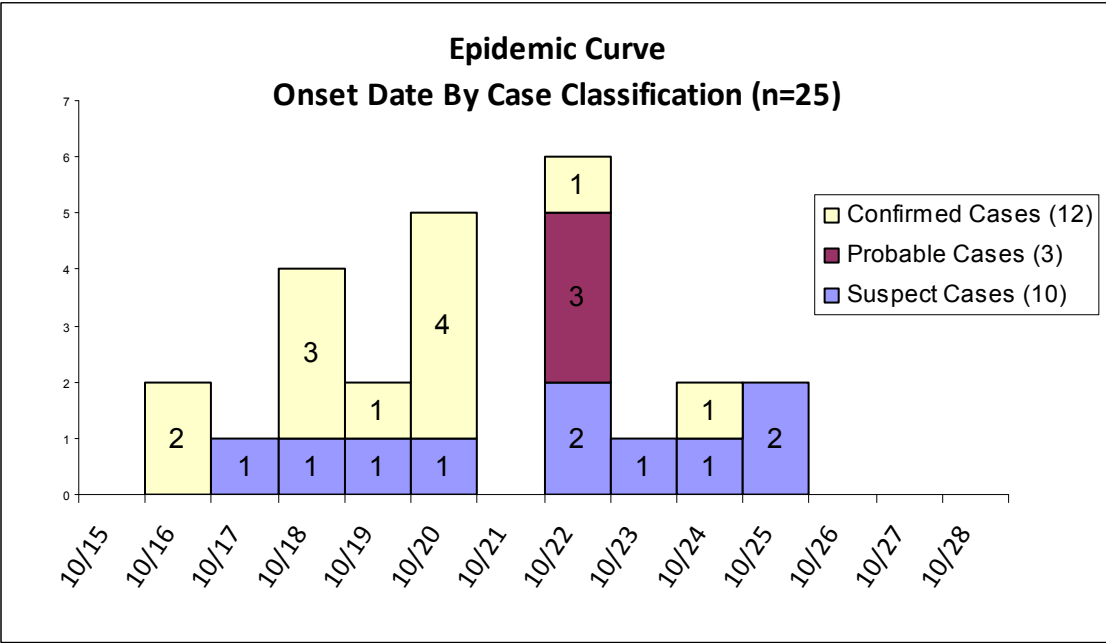


Table 3: DNA Fingerprinting (PFGE) of *E. coli* Positive Stool Cultures

Case	Organism <sup>3</sup>	Xba1 enzyme <sup>4</sup>	Bln1 pattern
1	0157:H7 ST2	EXHX01.0125	EXHA16.0570
2	0157:H7 ST2	EXHX01.0125	EXHA16.0570
3	0157:H7 ST2	EXHX01.0125	EXHA16.0570
4	0157:H7 ST2	EXHX01.0571	EXHA16.0570
5	0157:H7 ST2	EXHX01.0125	EXHA16.0570
6	0157:H7 ST2	EXHX01.0125	EXHA16.0570
7	0157:H7 ST2	EXHX01.0125	EXHA16.0570
8	0157:H7 ST2	EXHX01.0125	EXHA16.0570
9	0157:H7 ST2	EXHX01.0125	EXHA16.0570
10	0157:H7 ST2	EXHX01.0125	EXHA16.0570
11	0157:H7 ST2	EXHX01.0125	EXHA16.0570

<sup>3</sup> ST2 indicates Shiga toxin 2.

<sup>4</sup> EXHX01.0571 is 97.68% related to pattern EXHX01.0125.



Figure 4: Control Selection algorithm

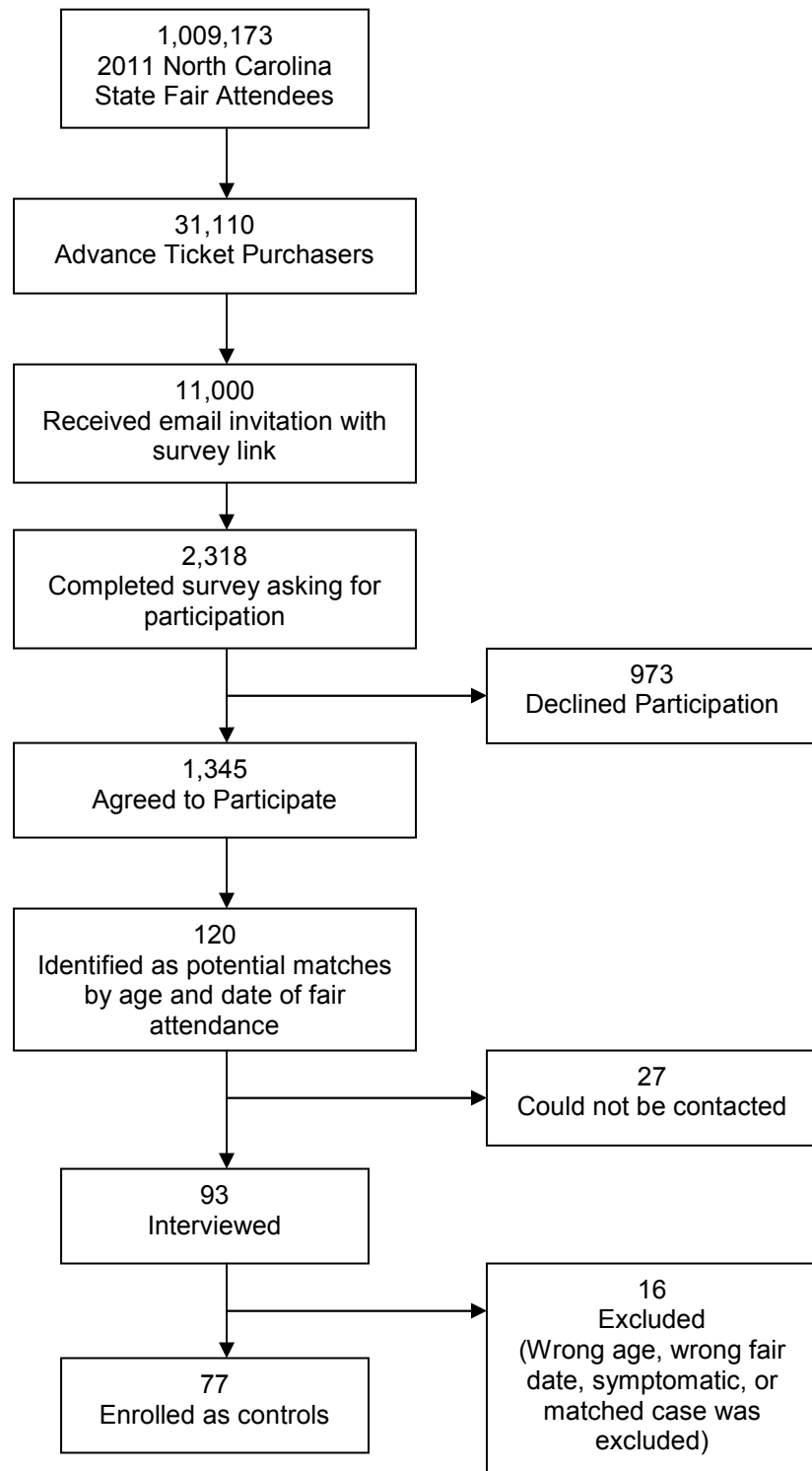


Table 4: Demographics of Cases and Controls

Age	Cases		Controls	
	n	%	n	%
Mean	27	--	25	--
Median	24		26	
Range	1 to 67	--	1 to 54	--
Sex	n	%	n	%
Male	10	40	23	30
Female	15	60	54	70
Race	n	%	n	%
White	23	92	66	86
Black	2	8	5	6
American Indian/Alaskan Native	0	0	0	0
Northwest Pacific Islander	0	0	0	0
Asian	0	0	1	1
Other	0	0	4	5
Unknown	0	0	1	1
Hispanic	n	%	n	%
Yes	2	8	3	4
No	23	92	72	96
County of Residence	n	%	n	%
Chatham	0	0	1	1
Cleveland	1	4	0	0
Durham	1	4	10	14
Franklin	0	0	1	1
Gates	0	0	1	1
Granville	0	0	2	3
Guilford	0	0	3	4
Hyde	0	0	1	1
Johnston	2	8	6	8
Lenoir	0	0	2	3
Mecklenberg	0	0	1	1
Moore	0	0	1	1
NA	0	0	1	1
Nash	0	0	2	3
Onslow	0	0	2	3
Orange	1	4	4	5
Randolph	0	0	1	1
Sampson	6	24	1	1
Union	0	0	1	1
Wake	11	44	31	42
Washington	0	0	1	1
Watauga	1	4	0	0
Wilson	2	8	0	0
Risk Factors	n	%	n	%
Attends Daycare	1	4	6	5
Attends School	10	40	27	40
Attends College	4	16	4	6
Food Service Worker	1	4	2	3
Health Care Worker	0	0	6	8
Resides/ Works in Correctional Facility	0	0	1	1
Resides/Works in Residential Home	0	0	10	14
Military	1	4	2	3
Recent Travel	0	0	0	0
Has livestock on property	2	9	1	1





Table 5: Attitudes and Beliefs of Cases and Controls

<u>Question</u>	<u>Answer</u>	<u>Cases</u>		<u>Controls</u>	
		<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
How important are animal exhibits to you?	Very important	2	8	12	16
	Important	5	20	19	25
	Not very important	7	28	23	30
	Not important	3	12	21	27
Are you aware that diseases can be transmitted through animal contact?	Yes	17	68	70	91
How often do you wash your hands before eating?	Always	9	36	28	36
	Almost always	6	24	30	39
	Sometimes	4	16	15	19
	Never	0	0	1	1
Do you carry hand sanitizer with you?	Yes	12	48	55	71

Table 6: Case Control Results – Select Animal Exhibits  
(Note: Denominator excludes missing values)<sup>5</sup>

<u>Variable</u>	<u>Cases</u> <u>n (%)</u>	<u>Controls</u> <u>n (%)</u>	<u>mOR</u>	<u>LL</u>	<u>UL</u>
Kelley Building	<b>12 (67)</b>	<b>21 (28)</b>	<b>5.61</b>	<b>1.64</b>	<b>19.19</b>
Sheep and Goat Tent	<b>6 (33)</b>	<b>7 (9)</b>	<b>4.37</b>	<b>1.16</b>	<b>16.49</b>
Children's Barnyard	4 (20)	18 (23)	0.88	0.25	3.18
Graham Building	9 (43)	36 (47)	0.99	0.36	2.70
Poultry Tent	6 (29)	17 (22)	1.41	0.47	4.28
Ark (Expo Building)	8 (40)	26 (34)	1.49	0.47	4.70
Petting Zoo	2 (10)	2 (3)	3.75	0.51	27.50

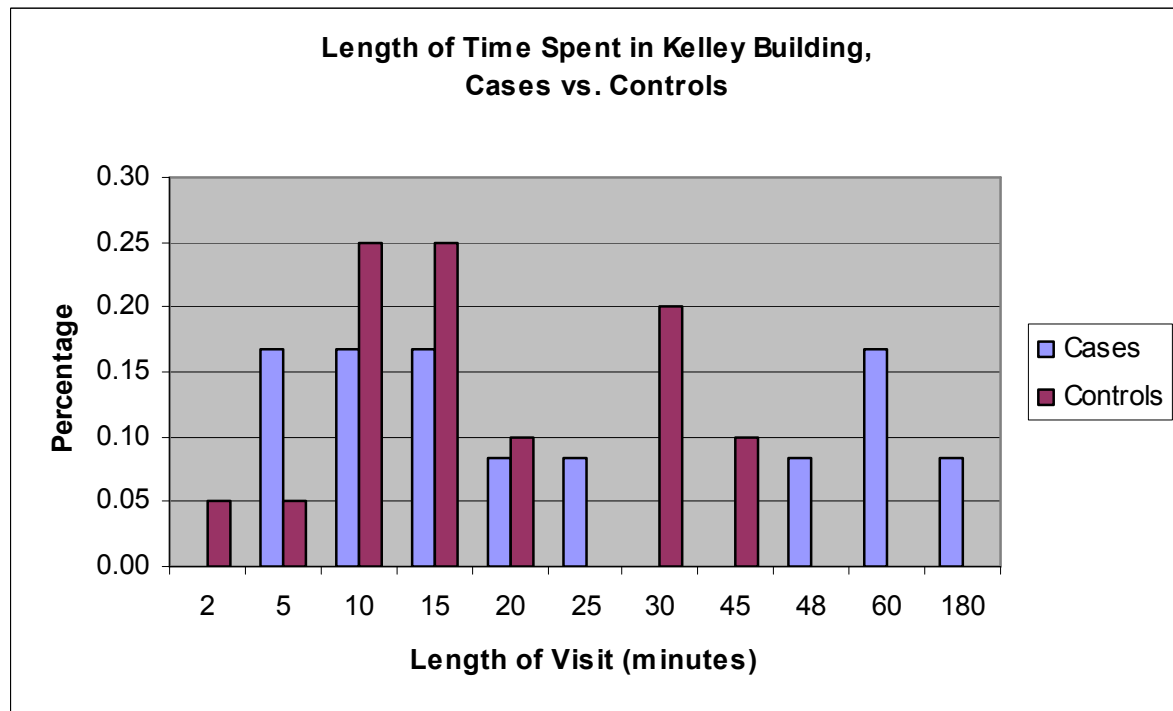
<sup>5</sup> mOR: matched odds ratio, LL: lower limit and UL: upper limit of 95% confidence interval

Table 7: Kelley Building Activities

(Note: Denominator includes only those persons who visited the Kelley Building)

In Kelley Building, did you...	Case n (%)	Control n (%)
Touch Animals	3 (12)	5 (6)
Touch Rails	9 (36)	10 (13)
Nuzzle Animals	1 (4)	2 (3)
Eat	1 (4)	1 (1)
Drink	2 (8)	2 (3)
Touch Animal Manure	5 (20)	1 (1)
Pick up object from ground	1 (4)	0 (0)
Chew gum	1 (4)	2 (3)
Suck on a pacifier or sippy cup	1 (4)	0 (0)
Use a stroller	2 (8)	1 (1)

Figure 5: Length of Time Spent in Kelley Building, Cases vs. Controls





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Beverly Eaves Perdue, Governor  
Lanier Cansler, Secretary

Jeffrey P. Engel, MD  
State Health Director

October 25, 2011

To: All North Carolina Health Care Providers  
From: Megan Davies, MD, State Epidemiologist  
Re: **Identification, management and reporting of *E. coli* O157 infections**

Public health officials are investigating a cluster of *E. coli* O157 infections and hemolytic uremic syndrome (HUS) cases that have been identified among Wake County residents during the past two weeks. Investigations are ongoing to determine the source (or sources) of infection.

This memo is intended to enhance your awareness and to encourage reporting of suspected *E. coli* O157 infections among patients in your practices. It is also intended to remind you of the recent literature on nephroprotection to prevent hemolytic uremic syndrome (HUS) in susceptible individuals<sup>1</sup>.

**Clinical Issues**

- **Early recognition and IV hydration may help prevent renal failure.**
- Consider *E. coli* O157 infection in any individual presenting with acute onset of severe or bloody diarrhea. Fever might be present but is not a prominent sign. HUS is most likely to develop in young children and the elderly several days after the onset of gastrointestinal symptoms.
- Young children with severe diarrhea may appear euvolemic or "puffy" when in fact they may be severely dehydrated. This puffiness or edema results from the severe protein loss from diarrhea.
- Have a low threshold for admitting young children or the elderly for IV hydration if they have presented with severe diarrhea. Careful monitoring is needed during IV hydration.
- Antimicrobial therapy is not indicated in the treatment of gastroenteritis due to *E. coli* O157:H7.

**Laboratory Issues**

- Use your usual clinical lab resource to send stool for culture. Specifically order testing for *E. coli* O157:H7.
- Clinical labs should send all isolates (or broth from shiga toxin positive samples if culture was not performed) to the State Lab of Public Health for additional testing, which may include pulsed-field gel electrophoresis (PFGE) or "DNA fingerprinting" to look for related isolates.

**Public Health Issues**

- By law, all suspected shiga toxin-producing *E. coli* infections and HUS cases must be reported within 24 hours to your local health department.
- Report all suspect cases. **Do not wait for laboratory confirmation.**

**To report suspected cases, please contact your local health department or contact the epidemiologist on call at 919-733-3419.**

1. Ake JA et al. Relative Nephroprotection During Escherichia coli O157:H7 Infections: Association with Intravenous Volume Expansion. *Pediatrics*. 2006;115:e673–680.



North Carolina Public Health  
Working for a healthier and safer North Carolina  
Everywhere. Everyday. Everybody.



Location: 225 N. McDowell Street • Raleigh, N.C. 27603



# Communicable Disease Branch Program Alert

## 2011 State Fair Outbreak Investigation

Date: October 29, 2011

Dear NC State Fair Attendee,

The NC Division of Public Health is investigating cases of *E. coli* that appear to be associated with attendance at the 2011 NC State Fair in Raleigh. To date, the State Fair is the only identified common link. In order to identify specific activities at the Fair which may have been the source of illness, we need to interview people who attended the Fair but did not get sick.

I would like to invite you to participate in a survey being conducted by the NC Division of Public Health. If you would like to participate please click on this link ([link provided](#)) to provide information that will allow the Division of Public Health to contact you. The survey has 6 questions. The Division of Public Health will contact a randomly selected subset of respondents, so even if you agree to participate you may not be contacted.

If you would like more information about this investigation, please visit the NC Division of Public Health website, where you can view the most current press releases, or call 919-7XX - XXXX.

<http://publichealth.nc.gov/>

Thank you for your consideration and we greatly appreciate your participation.

Sincerely,

Megan Davies, M.D.  
State Epidemiologist  
North Carolina Division of Public Health  
North Carolina Department of Health and Human Services

Communicable Disease Branch · Epidemiology Section · Division of Public Health  
N.C. Department of Health and Human Services  
Raleigh, N.C. · [www.ncdhhs.gov](http://www.ncdhhs.gov)



Survey Participation
<p><b>1. Are you willing to participate in a telephone survey from a public health professional to discuss foods you may have eaten at the 2011 NC State fair and animal exhibits that you may have visited?</b></p> <p><input type="radio"/> yes</p> <p><input type="radio"/> no</p>
<p><b>*2. Please give us your first and last name.</b></p> <p><input type="text"/></p>
<p><b>*3. Please provide a telephone number where you can be reached (area code first).</b></p> <p><input type="text"/></p>
<p><b>*4. Please tell us how many people in your party (including yourself) attended the 2011 NC State Fair.</b></p> <p><input type="radio"/> 1 person</p> <p><input type="radio"/> 2-5 people</p> <p><input type="radio"/> more than 5 people in my party attended</p>
<p></p>



**\*5. Please tell us the age of each member of your party.**

	18 years of age and younger	19 years of age and older
Yourself	<input type="checkbox"/>	<input type="checkbox"/>
Second Person	<input type="checkbox"/>	<input type="checkbox"/>
Third Person	<input type="checkbox"/>	<input type="checkbox"/>
Fourth Person	<input type="checkbox"/>	<input type="checkbox"/>
Fifth Person	<input type="checkbox"/>	<input type="checkbox"/>
Sixth Person	<input type="checkbox"/>	<input type="checkbox"/>
Seventh Person	<input type="checkbox"/>	<input type="checkbox"/>
Eighth Person	<input type="checkbox"/>	<input type="checkbox"/>
Ninth Person	<input type="checkbox"/>	<input type="checkbox"/>
Tenth Person	<input type="checkbox"/>	<input type="checkbox"/>

**6. Please check the box for tell us the dates that each member of your party attended the state fair. Check all that apply.**

	Oct 13, Thurs	Oct 14, Fri	Oct 15, Sat	Oct 16, Sun	Oct 17, Mon	Oct 18, Tue	Oct 19, Wed	Oct 20, Thur	Oct 21, Fri	Oct 22, Sat	Oct 23, Sun
Yourself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Second Person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Third Person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fourth Person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fifth Person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sixth Person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seventh Person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eighth Person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ninth Person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tenth Person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Thank you!**



**Case Name:** \_\_\_\_\_ **Age:** \_\_\_\_\_  
**Parent / Guardian:** \_\_\_\_\_  
**Phone Number:** \_\_\_\_\_

**NORTH CAROLINA DHHS  
DIVISION OF PUBLIC HEALTH  
nc STATE FAIR STEC OUTBREAK: CASE QUESTIONNAIRE**

Phone attempts: **Document on CALL LOG**

Interviewer: \_\_\_\_\_

Date of interview: \_\_\_\_\_

mm dd

yy

***"Hi, my name is \_\_\_\_\_, I'm calling from the North Carolina Division of Public Health.***

***(If case is less than 18 years of age) "May I speak with \_\_\_\_\_'s (CASE NAME) parent or guardian?"***

***(If YES and CASE < 18 ) ► "Could you tell me your name?"***

***Parent / guardian name: \_\_\_\_\_ Mother ☐ Father ☐ Guardian***

☐

***(If case is 18 years of age or older) "May I speak with \_\_\_\_\_ (CASE NAME)?"***

***(If NO) ► "When would be a convenient time to call to speak with \_\_\_\_\_ or another adult?"***

***► Schedule date / time on CALL LOG***

***"As you may know from the recent media coverage, we are investigating E. coli infections among persons who attended the North Carolina State Fair. We appreciate the information that has been provided regarding (your / your child's) illness and realize that you may have already spoken with someone from the county or state. We are now conducting more detailed interviews to help us understand what caused these E. coli infections. All of your answers will be kept confidential and you should not feel obligated in any way to answer these additional questions. The questionnaire will take about 20 minutes to complete. Are you willing to answer these additional questions about (you / your child's) illness?" Y(1) N(0) DK(9) (circle)***

***(If NO) ► "Your participation would be very helpful in understanding this outbreak. Is there a better time when (you / you and your child) could participate?"***

***(If YES) ► Schedule date / time on CALL LOG when appropriate person(s) are available***

***(If NO) ► "Thank you."***

***(If YES) ► "Is now a good time?"***

***(If NO) ► Schedule date / time on CALL LOG when appropriate person(s) are available***

***(If case is 18 years of age or older) ► Proceed to Section A***

***(If case less than 18 years of age) ► "I would like to interview the parent, guardian, or other adult most familiar with \_\_\_\_\_'s (CASE NAME) activities at the State Fair. Would it be possible to speak with that person? If \_\_\_\_\_ (CASE NAME) would like to be present on the phone during the interview to add comments and help answer questions, they are welcome to do so."***

***(If OK) ► Proceed to Section A***

***(If not available) ► Schedule date / time on CALL LOG***



## Section A

***"Before I go any further I want to confirm that (you / your child) attended the North Carolina State Fair in Raleigh between October 13 and 23, 2011. Is this correct?"***

Y(1) N(0)

DK(9) (circle)

(If NO) ► "Thank you. At this time we are only interviewing persons that attended the State Fair."

(If YES) ► "Thank you for agreeing to participate. Some of these questions may have been asked already. It is

important that we ask everyone the same questions in the same way during this part of the investigation. We will be talking about dates before, during, and after the fair. Having a calendar available will help us with these dates. Would you like to get a calendar before we begin?" (Allow time for interviewee to get calendar)

***"I need to verify some information about (your / your child's) age, sex, and county of residence."***

1. What is (your / your child's) date of birth?  
(mm/dd/yy)

\_\_\_ / \_\_\_ / \_\_\_

2. Sex? Male Female UNK/Refused (circle)

(If FEMALE) ► Are you currently pregnant?  
DK(9) (circle)

Y(1) N(0)

3. What is (your/ your child's) race?

White  
Black/African American  
American Indian/Alaskan Native  
Native Hawaiian or Pacific Islander  
Asian  
Other, specify: \_\_\_\_\_  
Unknown

4. Do you consider yourself to be of Hispanic origin?  
(circle)

Y(1) N(0) DK(9)

5. What is (your / your child's) county of residence?

\_\_\_\_\_

5A. What is your US postal address?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(street 1, Apt number)  
(street 2)  
(city, state, zip code + 4)

5B. Does your family keep cattle, sheep or goats on your home property? Y(1) N(0) DK(9)  
(circle)

(If YES) ► Circle animal(s): cattle sheep goats

6. Does your child attend daycare? Y(1) N(0) DK(9) (circle)

7. Do you/Does your child attend school? Y(1) N(0) DK(9)  
(circle)

8. Do you/Does your child attend college or university? Y(1) N(0) DK(9)  
(circle)

9. Are you/your child a food service worker? Y(1) N(0) DK(9)  
(circle)

10. Are you/your child a healthcare worker? Y(1) N(0) DK(9)





- (circle)
11. Do you/your child live or work in a correctional facility? Y(1) N(0)  
DK(9) (circle)
12. Do you/your child live or work in a residential home? Y(1) N(0) DK(9)  
(circle)
13. Are you/your child active military, military dependent or a retiree? Y(1) N(0) DK(9)  
(circle)
14. Have you/your child traveled outside of the US in the past 30 days? Y(1) N(0) DK(9)  
(circle)

15. On what day did (your / your child's) illness begin? \_\_\_\_ / \_\_\_\_ / \_\_\_\_ (mm/dd/yy, prompt with calendar if necessary, this is [ONSET DATE])

16. (Are you / Is your child) still ill? Y(1) N(0) DK(9) (circle)  
(If NO) ► How many days did the illness last? \_\_\_\_ days

17. Now I would like to ask you about (your / your child's) diarrhea. Did (you / your child) have:  
(Use calendar to assist with onset date and duration of diarrhea)

Diarrhea? Y(1) N(0) DK(9) (circle)  
(If YES) ► What was the maximum number of stools in a 24-hour period?  
On what day did (your / your child's) diarrhea begin? (mm/dd/yy)  
Still having diarrhea? Y(1) N(0) DK(9) (circle)  
(If NO) ► How many days did the diarrhea last? DK(99)

Any bloody diarrhea? Y(1) N(0) DK(9) (circle)  
(If YES) ► On what day did (your / your child's) bloody diarrhea begin? (mm/dd/yy)  
Still having bloody diarrhea? Y(1) N(0) DK(9) (circle)  
(If NO) ► How many days did the bloody diarrhea last? DK(99)

18. Now I would like to ask you about other symptoms you / your child may have had.

Nausea? Y(1) N(0) DK(9) (circle)  
Vomiting? Y(1) N(0) DK(9) (circle)  
Abdominal cramps? Y(1) N(0) DK(9) (circle)  
Fever (subjective)? Y(1) N(0) DK(9) (circle)

(If YES) ► Maximum (F): \_\_\_\_

Chills? Y(1) N(0) DK(9) (circle)  
Headache? Y(1) N(0) DK(9) (circle)  
Body aches? Y(1) N(0) DK(9) (circle)  
Fatigue? Y(1) N(0) DK(9) (circle)  
Constipation? Y(1) N(0) DK(9) (circle)  
Other?: Y(1) N(0) DK(9) (circle)

(If YES) ► Specify

19. Of the symptoms we just talked about, what was the first symptom that (you / your child) had? I can read them back to you if needed. ► Specify

**"Let's talk about the dates that (you / your child) attended the State Fair. We can use the calendar to help us remember specific dates. The fair ran from Thursday, October 13 through Sunday, October 23."**

20. On what days did you/ your child attend the State Fair? (Circle the date(s) attended)

THURSDAY	FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY
10/13	10/14	10/15	10/16	10/17	10/18	10/19
10/20	10/21	10/22	10/23			

21. (Were you / Was your child) or another household member at the fair to exhibit animals?



Y(1) N(0) DK(9) (circle)

(If YES) ► Which of the following animals did (you / your child) exhibit or show at the State Fair?  
(Read choices)

Horses	Y(1)	N(0)	DK(9)	(circle)
Dairy cattle	Y(1)	N(0)	DK(9)	(circle)
Beef cattle	Y(1)	N(0)	DK(9)	(circle)
Swine	Y(1)	N(0)	DK(9)	(circle)
Sheep	Y(1)	N(0)	DK(9)	(circle)
Goats	Y(1)	N(0)	DK(9)	(circle)
Poultry	Y(1)	N(0)	DK(9)	(circle)
Rabbits	Y(1)	N(0)	DK(9)	(circle)
Other	Y(1)	N(0)	DK(9)	(circle), (If YES) ► Specify:

## Section B

***“Now I am going to ask about various activities that (you / your child) did at the State Fair.”***

1. Did (you / your child) visit the horse show arena and stables across from Youth Center Road?  
Y(1) N(0) DK(9) (circle)

(If YES) ► Did (you / your child) visit or do any of the following at the horse complex?  
(Read choices)

Eat at the restaurant?	Y(1)	N(0)	DK(9)
(circle)			
Enter the main show arena?	Y(1)	N(0)	DK(9)
(circle)			
(If YES) ► Watch horse show?	Y(1)	N(0)	DK(9)
(circle)			
Visit the permanent or temporary stall areas?	Y(1)	N(0)	DK(9)
(circle)			

***“There was a cider press at the fair, it was near the Village of Yesteryear and the lake. “***

2. Did (you / your child) visit the cider press? Y(1) N(0)  
DK(9) (circle)  
(If YES) ► Did (you / your child) drink any fresh pressed apple cider? Y(1) N(0)  
DK(9) (circle)

***“There were several other attractions near the cider press.”***

3. Did (you / your child) attend any of the following?  
Flower and garden show Y(1) N(0) DK(9)  
(circle)  
Village of Yesteryear in the Holshouser Building? Y(1) N(0) DK(9)  
(circle)  
Did (you / your child) use the restrooms in the Holshouser Building? Y(1) N(0) DK(9)  
(circle)

4. Did (you / your child) come in contact with the water in the lake? Y(1) N(0)  
DK(9) (circle)

***“There were a couple of water rides at the fair.”***

5. Did (you / your child) ride any of the water rides? Y(1) N(0)  
DK(9) (circle)  
(If YES) ► Did (you / your child) ride the water bumper boats? Y(1) N(0)  
DK(9) (circle)  
Did (you / your child) ride the water chute or flume? Y(1) N(0)  
DK(9) (circle)

6. Did (you / your child) come in contact with the water or mist from the fountain in front of Dorton Arena?  
Y(1) N(0) DK(9) (circle)



7. Did (you / your child) ride any land rides (non-water rides) while at the fair? Y(1) N(0)  
DK(9) (circle)

8. Did (you / your child) participate in the Field of Dreams exhibit (vegetable exhibit)? Y(1) N(0)  
DK(9) (circle)

### Section C: Animal Contact

***“Let’s talk about the areas where farm animals were located on the State Fairgrounds. I would like to ask about each area and (your / your child’s) activities in those areas.”***

1. Did (you / your child) go into the Kelley Building, it is the older building with the round roof where exhibitors housed sheep, goats, and pigs? Y(1) N(0)  
DK(9) (circle)

**(If NO) ► GO TO C-2**

(If YES) ► Did (you / your child) feed, pet or touch the sheep, goats, or pigs in the Kelley building? Y(1) N(0) DK(9)  
(circle)  
(If YES) ► Specify: Sheep (1) Goats(2) Pigs(3) (circle all that apply)

Did (you / your child) touch or lean on the sheep, goat, or pig pens or rails in the Kelley building? Y(1) N(0) DK(9)  
(circle)  
(If YES) ► Specify: Sheep (1) Goats(2) Pigs(3) (circle all that apply)

Did the sheep or goats nuzzle, nibble, or lick (you/your child)? Y(1) N(0) DK(9) (circle)

Did (you / your child) eat anything while in the Kelley Building? Y(1) N(0) DK(9)  
(circle)  
(If YES) ► What?, Specify: \_\_\_\_\_

Did (you / your child) drink anything while in the Kelley Building? Y(1) N(0) DK(9)  
(circle)  
(If YES) ► What?, Specify: \_\_\_\_\_

Did (you / your child) ►  
Touch or step in manure or poop in the Kelley Building? Y(1) N(0) DK(9) (circle)  
Pick up any object from the ground? Y(1) N(0) DK(9)  
(circle)  
Chew gum, eat candy, or use a toothpick? Y(1) N(0) DK(9)  
(circle)  
Kiss any animals? Y(1) N(0) DK(9)  
(circle)  
Fall down or sit on the ground in the Kelley building? Y(1) N(0) DK(9)  
(circle)

***If CASE is a CHILD <6 years old:***

Carry a toy or blanket through the building? Y(1) N(0) DK(9)  
(circle)  
Suck on their thumb, a pacifier or drink from a sippy cup? Y(1) N(0) DK(9) (circle)  
Ride in a stroller through the exhibit? Y(1) N(0) DK(9) (circle)

How long (were you / was your child) in the Kelley building? (total for all visits in minutes) \_\_\_\_\_ minutes

Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water or use hand wipes upon exiting the Kelley building? Y(1) N(0) DK(9) (circle)

(If YES) ► Which one? Hand sanitizing gel(1) Soap/Water(2)  
Handwipes(3) (circle)



2. Did (you / your child) go into the Sheep & Goat tent, it was located across from the Kelley building, beside the Ark? Y(1)  
 N(0) DK(9) (circle)

**(If NO) ► GO TO C-3**

(If YES) ► Did (you / your child) feed, pet or touch the sheep or goats? Y(1) N(0)

DK(9) (circle)

(If YES) ► Specify: Sheep (1) Goats(2) (circle all that apply)

Did (you / your child) touch or lean on the sheep or goat pens? Y(1) N(0) DK(9) (circle)

Did the sheep or goats nuzzle, nibble, or lick you/your child? Y(1) N(0) DK(9)  
 (circle)

Did (you / your child) eat anything while in the Sheep & Goat tent? Y(1) N(0) DK(9)  
 (circle)

(If YES) ► What?, Specify: \_\_\_\_\_

Did (you / your child) drink anything while in the Sheep & Goat tent? Y(1) N(0)  
 DK(9) (circle)

(If YES) ► What?, Specify: \_\_\_\_\_

Did (you / your child) ►

Touch or step in manure or poop in the Sheep & Goat tent? Y(1) N(0) DK(9)  
 (circle)

Pick up any object from the ground? Y(1) N(0) DK(9)  
 (circle)

Chew gum, eat candy, or use a toothpick? Y(1) N(0) DK(9)  
 (circle)

Kiss any animals? Y(1) N(0) DK(9)  
 (circle)

Fall down or sit on the ground in the Sheep and Goat tent? Y(1) N(0) DK(9)  
 (circle)

*If CASE is a CHILD <6 years old:*

Carry a toy or blanket through the tent? Y(1) N(0) DK(9) (circle)

Suck on their thumb, a pacifier or drink from a sippy cup? Y(1) N(0) DK(9) (circle)

Ride in a stroller through the exhibit? Y(1) N(0) DK(9) (circle)

How long (were you/was your child) in the Sheep & Goat tent? (total for all visits in min) \_\_\_\_\_ minutes

Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water or

use hand wipes upon exiting the Sheep & Goat tent? Y(1) N(0) DK(9) (circle)

(If YES) ► Which one? Hand sanitizing gel(1) Soap/Water(2) Hand  
 wipes(3) (circle)

3. Did (you / your child) go into the Children's Barnyard, which was a red wooden building across from the Village of

YesterYear, and next to the Old Farm machinery building? Y(1) N(0)

DK(9) (circle)

**(If NO) ► GO TO C-4**

(If YES) ► (If interviewing a parent) Did your child walk through the Barnyard, or were they carried?

WALK(1)



CARRIED(2) DK(9)

Did (you / your child) feed, pet or touch any poultry or chickens?	Y(1)	N(0)	
DK(9) (circle)			
Did (you / your child) touch or lean on the cages?	Y(1)	N(0)	DK(9)
(circle)			
Did (you / your child) feed, pet or touch the cows, sheep or goats?	Y(1)	N(0)	
DK(9) (circle)			
(If YES) ► Specify: Sheep (1) Goats(2) Cows(3)			(circle)
all that apply)			
Did (you / your child) touch or lean on the cow, sheep or goat pens?	Y(1)	N(0)	DK(9)
(circle)			
Did the sheep or goats nuzzle, nibble, or lick you/your child?	Y(1)	N(0)	DK(9)
(circle)			
Did (you / your child) feed, pet or touch the pigs in the Children's Barnyard?	Y(1)	N(0)	DK(9)
(circle)			
Did (you / your child) touch or lean on the pig pens?	Y(1)	N(0)	
DK(9) (circle)			
Did (you / your child) pick up any baby chicks?	Y(1)	N(0)	DK(9)
(circle)			
Did (you / your child) eat anything while in the Children's Barnyard?	Y(1)	N(0)	DK(9)
(circle)			
(If YES) ► What?, Specify: _____			
Did (you / your child) drink anything while in the Children's Barnyard?	Y(1)	N(0)	
DK(9) (circle)			
(If YES) ► What?, Specify: _____			
Did (you / your child) ►			
Touch or step in manure or poop in the Children's Barnyard?	Y(1)	N(0)	DK(9)
(circle)			
Pick up any object from the ground?	Y(1)	N(0)	DK(9)
(circle)			
Chew gum, eat candy, or use a toothpick?	Y(1)	N(0)	DK(9)
(circle)			
Kiss any animals?	Y(1)	N(0)	DK(9)
(circle)			
Fall down or sit on the ground in the barn?	Y(1)	N(0)	DK(9)
(circle)			
If CASE is a CHILD <6 years old:			
Carry a toy or blanket through the building?	Y(1)	N(0)	DK(9)
(circle)			
Suck on their thumb, a pacifier or drink from a sippy cup?	Y(1)	N(0)	DK(9) (circle)
Ride in a stroller through the exhibit?	Y(1)	N(0)	DK(9) (circle)
How long (were you / was your child) in the Children's Barnyard? (total for all visits in min) _____ minutes			
Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water			
or			
use hand wipes upon exiting the Children's Barnyard?	Y(1)	N(0)	DK(9) (circle)
(If YES) ► Which one? Hand sanitizing gel(1) Soap/Water(2) Hand			
wipes(3) (circle)			

4. Did (you / your child) go into the Graham Building, the large building beside Dorton Arena where the cows were located? Y(1) N(0) DK(9) (circle)



**(If NO) ► GO TO C-5**

(If YES) ► Did (you/your child) feed, pet or touch the cows in the Graham building? Y(1) N(0)

DK(9) (circle)

Did (you / your child) eat anything while in the Graham Building? Y(1) N(0) DK(9)  
(circle)

(If YES) ► What?, Specify: \_\_\_\_\_

Did (you / your child) drink anything while in the Graham Building? Y(1) N(0)  
DK(9) (circle)

(If YES) ► What?, Specify: \_\_\_\_\_

Did (you / your child) ►

Touch or step in manure or poop in the Graham Building? Y(1) N(0) DK(9)  
(circle)

Pick up any object from the ground? Y(1) N(0) DK(9)  
(circle)

Chew gum, eat candy or use a toothpick? Y(1) N(0) DK(9)  
(circle)

Kiss any animals? Y(1) N(0) DK(9)  
(circle)

Fall down or sit on the ground in the Graham building? Y(1) N(0) DK(9) (circle)

*If CASE is a CHILD <6 years old:*

(circle) Carry a toy or blanket through the building? Y(1) N(0) DK(9)

Suck on their thumb, a pacifier or drink from a sippy cup? Y(1) N(0) DK(9)  
(circle)

Ride in a stroller through the exhibit? Y(1) N(0) DK(9)  
(circle)

How long (were you/was your child) in the Graham building? (total for all visits in minutes) \_\_\_\_\_ minutes

Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water  
or

use hand wipes upon exiting the Graham building? Y(1) N(0) DK(9) (circle)

(If YES) ► Which one? Hand sanitizing gel (1) Soap/Water (2) Hand  
wipes (3) (circle)

Did (you/your child) use the restrooms in the Graham building? Y(1) N(0) DK(9) (circle)

5. Did (you / your child) go into the baby poultry exhibit behind the Graham Building?

Y(1) N(0) DK(9) (circle)

**(If NO) ► GO TO C-6**

(If YES) ► Did (you / your child) feed, pet or touch any poultry or chickens? Y(1) N(0)  
DK(9) (circle)

Did (you / your child) touch or lean on the cages? Y(1) N(0)  
DK(9) (circle)

Did (you / your child) eat anything while in the Poultry tent? Y(1) N(0)  
DK(9) (circle)

(If YES) ► What?, Specify: \_\_\_\_\_

Did (you / your child) drink anything while in the Poultry tent? Y(1) N(0)  
DK(9) (circle)

(If YES) ► What?, Specify: \_\_\_\_\_



Did (you / your child) ►

Touch or step in manure or poop in the Poultry tent? Y(1) N(0) DK(9)  
(circle)

Pick up any object from the ground? Y(1) N(0) DK(9)  
(circle)

Chew gum, eat candy, or use a toothpick? Y(1) N(0) DK(9)  
(circle)

Kiss any animals? Y(1) N(0) DK(9)  
(circle)

Fall down or sit on the ground in the Poultry tent? Y(1) N(0) DK(9)  
(circle)

*If CASE is a CHILD <6 years old:*

Carry a toy or blanket through the tent? Y(1) N(0) DK(9) (circle)

Suck on their thumb, a pacifier or drink from a sippy cup? Y(1) N(0) DK(9) (circle)

Ride in a stroller through the exhibit? Y(1) N(0) DK(9) (circle)

How long (were you / was your child) in the Poultry tent? (total for all visits in min)\_\_\_ minutes

Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water  
or

use hand wipes upon exiting the Poultry tent? Y(1) N(0) DK(9) (circle)

(If YES) ► Which one? Hand sanitizing gel (1) Soap/Water (2) Hand wipes (3) (circle)

6. Did (you / your child) go into the State Fair Ark exhibit, it was in the Expo building with the dairy cows  
that could be milked and where people received a carton of milk? Y(1)

N(0) DK(9) (circle)

**(If NO) ► GO TO C-7**

(If YES) ► Did (you / your child) feed, pet or touch the cows, sheep or goats? Y(1) N(0)

DK(9) (circle)

Did (you / your child) touch or lean on the cow, sheep or goat pens? Y(1) N(0) DK(9)  
(circle)

Did (you / your child) feed, pet or touch the pigs in the Ark? Y(1) N(0)  
DK(9) (circle)

Did (you / your child) touch or lean on the pig pens? Y(1) N(0) DK(9)  
(circle)

Did (you / your child) pet or touch the baby chicks in the Ark? Y(1) N(0)  
DK(9) (circle)

Did the sheep or goats nuzzle, nibble, or lick you/your child? Y(1) N(0)  
DK(9) (circle)

Did (you / your child) eat anything while in the State Fair Ark? Y(1) N(0) DK(9) (circle)  
(If YES) ► What?, Specify:\_\_\_\_\_

Did (you / your child) drink anything while in the State Fair Ark? Y(1) N(0) DK(9)  
(circle)

(If YES) ► What?, Specify:\_\_\_\_\_

Did (you / your child) ►

Milk a cow at the NC State Vet School demonstration? Y(1) N(0) DK(9) (circle)  
Touch or step in manure or poop in the Ark? Y(1) N(0) DK(9)  
(circle)

Pick up any object from the ground? Y(1) N(0) DK(9)  
(circle)

Chew gum, eat candy, or use a toothpick? Y(1) N(0) DK(9)  
(circle)

Kiss any animals? Y(1) N(0) DK(9)  
(circle)

Fall down or sit on the ground in the Ark? Y(1) N(0) DK(9)



(circle)

If CASE is a CHILD <6 years old:

Carry a toy or blanket through the Ark?	Y(1)	N(0)	DK(9)	(circle)
Suck on their thumb, a pacifier or drink from a sippy cup?	Y(1)	N(0)	DK(9)	(circle)
Ride in a stroller through the exhibit?	Y(1)	N(0)	DK(9)	(circle)

How long (were you/was your child) in the Ark? (total for all visits in min)\_\_\_ minutes

Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water or

use hand wipes upon exiting the State Fair Ark? Y(1) N(0) DK(9) (circle)  
(If YES) ► Which one? Hand sanitizing gel(1) Soap/Water(2) Hand wipes(3) (circle)

7. Did (you / your child) go into the Rabbit Barn near the Children's Barnyard? Y(1) N(0)  
DK(9) (circle)

(If NO) ► GO TO C-8

(If YES) ► Did (you / your child) feed, pet or touch rabbits? Y(1) N(0)  
DK(9) (circle)

Did (you / your child) touch or lean on the rabbit cages? Y(1) N(0) DK(9) (circle)

Did (you / your child) eat anything while in the Rabbit Barn? Y(1) N(0) DK(9)  
(circle)

(If YES) ► What?, Specify:\_\_\_\_\_

Did (you / your child) drink anything while in the Rabbit Barn? Y(1) N(0)  
DK(9) (circle)

(If YES) ► What?, Specify:\_\_\_\_\_

Did (you / your child) ►

Touch or step in manure or poop in the Rabbit Barn? Y(1) N(0) DK(9)  
(circle)

Pick up any object from the ground? Y(1) N(0) DK(9)  
(circle)

Chew gum, eat candy, or use a toothpick? Y(1) N(0) DK(9)  
(circle)

Fall down or sit on the ground in the Rabbit Barn? Y(1) N(0) DK(9)  
(circle)

If CASE is a CHILD <6 years old:

Carry a toy or blanket through the building?	Y(1)	N(0)	DK(9)	
(circle)				
Suck on their thumb, a pacifier or drink from a sippy cup?	Y(1)	N(0)	DK(9)	(circle)
Ride in a stroller through the exhibit?	Y(1)	N(0)	DK(9)	(circle)

How long (were you/was your child) in the Rabbit Barn? (total for all visits in min)\_\_\_ minutes

Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water or

use hand wipes upon exiting the Rabbit Barn? Y(1) N(0) DK(9) (circle)  
(If YES) ► Which one? Hand sanitizing gel(1) Soap/Water(2) Hand wipes(3) (circle)

8. Did (you / your child) ride on the ponies in between the Rabbit Barn and the Old Farm Machinery building?

Y(1) N(0) DK(9) (circle)

(If NO) ► GO TO C-9





Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water or use hand wipes after the pony rides? Y(1) N(0) DK(9) (circle)

(If YES) ► Which one? Hand sanitizing gel(1) Soap/Water(2) Hand wipes(3) (circle)

9. Did (you / your child) visit the mules behind the Grist Mill? Y(1) N(0)  
DK(9) (circle)

(If NO) ► GO TO C-10

Did (you / your child) pet or touch the mules? Y(1) N(0)  
DK(9) (circle)

Did (you / your child) feed the mules? Y(1) N(0) DK(9) (circle)

Did the mules nuzzle, nibble, or lick you/your child? Y(1) N(0) DK(9)  
(circle)

Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water or use hand wipes after the mule visit? Y(1) N(0) DK(9) (circle)

(If YES) ► Which one? Hand sanitizing gel(1) Soap/Water(2) Hand wipes(3) (circle)

10. Did (you / your child) go into the Amazing Animals Petting Zoo, located on the infield of the racetrack?

Y(1) N(0)

DK(9) (circle)

(If NO) ► GO TO C-11

(If YES) ► (If interviewing a parent) Did your child walk through the petting zoo, or were they carried?

WALK

CARRIED Don't Know

Did (you / your child) touch or lean the cages or pen railings? Y(1) N(0)  
DK(9) (circle)

Did (you / your child) feed, pet or touch the cows, sheep or goats? Y(1) N(0)  
DK(9) (circle)

Did (you / your child) touch or lean on the cow, sheep or goat pens? Y(1) N(0) DK(9)  
(circle)

Did (you / your child) eat anything while in the Petting Zoo? Y(1) N(0) DK(9)  
(circle)

(If YES) ► What? Specify: \_\_\_\_\_

Did (you / your child) drink anything while in the Petting Zoo? Y(1) N(0)  
DK(9) (circle)

(If YES) ► What? Specify: \_\_\_\_\_

Did (you / your child) ►

Touch or step in manure or poop in the Petting Zoo? Y(1) N(0) DK(9)  
(circle)

Pick up any shavings/bedding from the ground? Y(1) N(0) DK(9) (circle)

Handle any carrots or grain feed from the dispenser? Y(1) N(0) DK(9)  
(circle)

Pick up any object from the ground? Y(1) N(0) DK(9)  
(circle)

Chew gum, eat candy, or use a toothpick? Y(1) N(0) DK(9)  
(circle)

Kiss any animals? Y(1) N(0) DK(9)  
(circle)

Fall down or sit on the ground in the tent? Y(1) N(0) DK(9)  
(circle)



If CASE is a CHILD <6 years old:

Carry a toy or blanket through the tent?	Y(1)	N(0)	DK(9)	(circle)
Suck on their thumb, a pacifier or drink from a sippy cup?	Y(1)	N(0)	DK(9)	(circle)
Ride in a stroller through the exhibit?	Y(1)	N(0)	DK(9)	(circle)

How long (were you / was your child) in the Petting Zoo? (total for all visits in min)\_\_\_\_\_

Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water or use hand wipes upon exiting the Petting Zoo? Y(1) N(0) DK(9) (circle)

(If YES) ► Which one? Hand sanitizing gel(1) Soap/Water(2) Hand wipes(3)

(circle)

11. Did (you / your child) go into the regular Petting Zoo, which was between the Hogway speedway (pig racing) and the Midway rides and games?

Y(1) N(0) DK(9) (circle)

(If NO) ► GO TO C-12

(If YES) ► (If interviewing a parent ) Did your child walk through the petting zoo, or were they carried?

WALK(1)

CARRIED(2) DK(9)

Did (you / your child) pet or touch the sheep or goats? Y(1) N(0)

DK(9) (circle)

Did (you / your child) feed the sheep or goats? Y(1) N(0) DK(9) (circle)

Did (you/your child) pick up or hold any of the sheep or goats? Y(1) N(0) DK(9) (circle)

Did the sheep or goats nuzzle, nibble, or lick you/your child? Y(1) N(0) DK(9)

(circle)

Did the sheep or goats rear up and put their front feet on you/your child? Y(1) N(0) DK(9)

(circle)

Did (you / your child) pet or touch the animals in pens at the back of the tent? Y(1) N(0)

DK(9) (circle)

Did (you / your child) feed the animals in pens at the back of the tent? Y(1) N(0)

DK(9) (circle)

Did (you / your child) eat anything while in the Petting Zoo? Y(1) N(0) DK(9)

(circle)

(If YES) ► What?, Specify:\_\_\_\_\_

Did (you / your child) drink anything while in the Petting Zoo? Y(1) N(0)

DK(9) (circle)

(If YES) ► What?, Specify:\_\_\_\_\_

Did (you / your child) ►

Touch or step in manure or poop in Petting Zoo? Y(1) N(0) DK(9)

(circle)

Pick up any shavings/bedding from the ground? Y(1) N(0) DK(9) (circle)

Handle any carrots or grain feed from the dispenser? Y(1) N(0) DK(9)

(circle)

Pick up any object from the ground? Y(1) N(0) DK(9)

(circle)

Chew gum, eat candy, or use a toothpick? Y(1) N(0) DK(9)

(circle)

Kiss any animals? Y(1) N(0) DK(9)

(circle)



Fall down or sit on the ground in Petting Zoo?  
(circle)

Y(1) N(0) DK(9)

If CASE is a CHILD <6 years old:

Carry a toy or blanket through the tent?  
Suck on their thumb, a pacifier or drink from a sippy cup?  
Ride in a stroller through the exhibit?

Y(1) N(0) DK(9) (circle)  
Y(1) N(0) DK(9) (circle)  
Y(1) N(0) DK(9) (circle)

How long (were you / was your child) in the Petting Zoo?  
minutes

(total for all visits in min)\_\_\_\_

Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water  
or

use hand wipes upon exiting the Petting Zoo? Y(1) N(0) DK(9) (circle)  
(If YES) ► Which one? Hand sanitizing gel(1) Soap/Water(2) Hand wipes(3) (circle)

12. Did (you/your child) go into the Hogway Speedway, where the racing pigs were located?

Y(1) N(0)

DK(9) (circle)

(If NO) ► GO TO C-13

(If YES) ► (If interviewing a parent) Did (you / your child) touch or lean on the cages or pen  
railings?

Y(1) N(0)

DK(9) (circle)

Did (you / your child) feed, pet or touch the pigs?

Y(1) N(0)

DK(9) (circle)

Did (you / your child) touch or lean on the pig pens?

Y(1) N(0) DK(9)

(circle)

Did (you / your child) eat anything while in the Hogway Speedway?

Y(1) N(0) DK(9)

(circle)

(If YES) ► What?, Specify:\_\_\_\_\_

Did (you / your child) drink anything while in the Hogway Speedway?

Y(1) N(0)

DK(9) (circle)

(If YES) ► What?, Specify:\_\_\_\_\_

Did (you / your child) ►

Touch or step in manure or poop in the Hogway Speedway?

Y(1) N(0) DK(9)

(circle)

Pick up any shavings/bedding from the ground?

Y(1) N(0) DK(9) (circle)

Pick up any object from the ground?

Y(1) N(0) DK(9)

(circle)

Chew gum, eat candy, or use a toothpick?

Y(1) N(0) DK(9)

(circle)

Kiss any animals?

Y(1) N(0) DK(9)

(circle)

Fall down or sit on the ground in the tent?

Y(1) N(0) DK(9)

(circle)

If CASE is a CHILD <6 years old:

Carry a toy or blanket through the tent?  
Suck on their thumb, a pacifier or drink from a sippy cup?  
Ride in a stroller through the exhibit?

Y(1) N(0) DK(9) (circle)  
Y(1) N(0) DK(9) (circle)  
Y(1) N(0) DK(9) (circle)

How long (were you / was your child) in Hogway Speedway? (total for all visits in min)\_\_\_\_

Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water or  
use hand wipes upon exiting the Hogway Speedway? Y(1) N(0) DK(9) (circle)

(If YES) ► Which one? Hand sanitizing gel(1) Soap/Water(2) Hand wipes(3)  
(circle)



13. Did (you / your child) ride on the ponies in between the Gov. Kerr Scott building and Got to be NC Agriculture exhibit? Y(1) N(0)  
DK(9) (circle)

**(If NO) ► GO TO C-14**

- Did (you/your child) use a hand sanitizing gel, wash (your / his or her) hands with soap and water or use hand wipes after the pony rides? Y(1) N(0) DK(9) (circle)  
(If YES) ► Which one? Hand sanitizing gel(1) Soap/Water(2) Hand wipes(3) (circle)

14. Did (you/your child) watch any show/shows in the Kiddieland Fun Park? Y(1) N(0)  
DK(9) (circle)

**(If NO) ► GO TO C-15**

- (If YES) ► Which one(s)?  
Michelle's Magical Poodles Y(1) N(0) DK(9) (circle)  
Magic 4 U Dog and Rabbit Show Y(1) N(0) DK(9) (circle)

15. Did (you/your child) watch any livestock competitions in the Kelley Building? Y(1) N(0)  
DK(9) (circle)

**(If NO) ► GO TO C-16**

- (If YES) ► Which one(s)?  
Jr. Wether Showmanship (Sheep) Y(1) N(0) DK(9) (circle)  
Performance Market and Hog Show Y(1) N(0) DK(9) (circle)  
Jr. Market Barrow Show (Pigs) Y(1) N(0) DK(9) (circle)  
Jr. Market Barrow Showmanship (Pigs) Y(1) N(0) DK(9) (circle)

16. Did (you/your child) watch any livestock competitions in the Expo Center? Y(1) N(0)  
DK(9) (circle)

**(If NO) ► GO TO C-17**

- (If YES) ► Which one(s)?  
Jr. Sheep Showmanship Y(1) N(0) DK(9) (circle)  
Jr. Meat Goats Y(1) N(0) DK(9) (circle)  
Jr. Market Lamb Show Y(1) N(0) DK(9) (circle)  
Jr. Ewe Meat Breeds Y(1) N(0) DK(9) (circle)  
Market Barrow Show Y(1) N(0) DK(9) (circle)  
Market Gilt Show Y(1) N(0) DK(9) (circle)

17. Did (you/your child) watch any livestock competitions in the Graham Building? Y(1) N(0)  
DK(9) (circle)

**(If NO) ► GO TO C-18**

- (If YES) ► Which one(s)?  
Jr. Market Steer Show Y(1) N(0) DK(9) (circle)  
Feeder Calf Show Y(1) N(0) DK(9) (circle)  
Jr. Beef Heifer and Beef Showmanship Y(1) N(0) DK(9) (circle)  
Sale of Livestock Champions Y(1) N(0) DK(9) (circle)  
Livestock Special Awards Y(1) N(0) DK(9) (circle)



18. Did (you/your child) watch any show/shows in the Horse Complex? Y(1) N(0)  
DK(9) (circle)

**(If NO) ► GO TO C-19**

**(If YES) ► Which one(s)?**

Appaloosa Horse Show

Y(1) N(0) DK(9) (circle)

Walking and Spotted Saddle Horses

Y(1) N(0) DK(9) (circle)

Youth Day Horse Show

Y(1) N(0) DK(9) (circle)

19. Did (you/your child) visit any animal exhibits that have not been mentioned? Y(1) N(0)  
DK(9) (circle)

**(If NO) ► GO TO Section D**

**(If YES) ► Which one(s)?**

Exhibit 1		Animal Species		Location 1	
Exhibit 2		Animal Species		Location 2	
Exhibit 3		Animal Species		Location 3	

## Section D: FAIR FOOD AND DRINKS

***"Now I would like to ask you about food and drinks that (you / your child) ate and drank while at the State Fair."***

1. Did (you / your child) eat or drink at the fair? Y(1) N(0)  
DK(9) (circle)

**(If NO) ► GO TO SECTION E**

2. While (you were/ your child was) at the State Fair, did (you /your child) **always(1), almost always(2), sometimes(3), or never(4)** wash (your / his or her) hands before eating? (circle answer)

(If 1, 2 or 3) ► How did (you / your child) wash (your/ his or her) hands? (Read choices, circle all that apply)

Hand sanitizing gel (1)

Running water & soap (2)

Hand wipes (3)

Other (4)

(If OTHER) ► Specify: \_\_\_\_\_

3. Did (you / your child) eat any of the following items?(Read choices)

Hamburger or cheeseburger?

Y(1) N(0) DK(9)



(circle)  
 (If YES) ► Can you tell me where you purchased it?  
 Specify: \_\_\_\_\_  
 Were the hamburgers pink or undercooked? Y(1) N(0) DK(9) (circle)

Barbeque? Y(1) N(0) DK(9)  
 (circle)  
 (If YES) ► Specify type: \_\_\_\_\_  
 Can you tell me where you purchased it?  
 Specify: \_\_\_\_\_

Hot Dog? Y(1) N(0) DK(9)  
 (circle)  
 (If YES) ► Can you tell me where you purchased it?  
 Specify: \_\_\_\_\_

Turkey Leg? Y(1) N(0) DK(9)  
 (circle)  
 (If YES) ► Can you tell me where you purchased it?  
 Specify: \_\_\_\_\_

Ham? Y(1) N(0) DK(9)  
 (circle)  
 (If YES) ► Can you tell me where you purchased it?  
 Specify: \_\_\_\_\_

Sausage? Y(1) N(0) DK(9)  
 (circle)  
 (If YES) ► Can you tell me where you purchased it?  
 Specify: \_\_\_\_\_

Game meat? Y(1) N(0) DK(9)  
 (circle)  
 (If YES) ► Can you tell me where you purchased it?  
 Specify: \_\_\_\_\_

Raw Vegetables? Y(1) N(0) DK(9)  
 (circle)  
 (If YES) ► Specify type: \_\_\_\_\_  
 Can you tell me where you purchased it?  
 Specify: \_\_\_\_\_

Salad? Y(1) N(0) DK(9)  
 (circle)  
 (If YES) ► Specify type: \_\_\_\_\_  
 Can you tell me where you purchased it?  
 Specify: \_\_\_\_\_

Finger foods like fries, popcorn, peanuts, or other similar food items? Y(1) N(0)  
 DK(9) (circle)  
 (If YES) ► Specify type: \_\_\_\_\_  
 Can you tell me where you purchased it?  
 Specify: \_\_\_\_\_

Ice cream? Y(1)  
 N(0) DK(9) (circle)  
 (If YES) ► Can you tell me where you purchased it?  
 Specify: \_\_\_\_\_

Cotton candy? Y(1) N(0) DK(9) (circle)



(If YES) ► Can you tell me where you purchased it?

Specify: \_\_\_\_\_

Candy or caramel apples?  
(If YES) ► What type? Red candy apple  
Can you tell me where you purchased it?  
Specify: \_\_\_\_\_

Y(1) N(0) DK(9) (circle)  
Caramel apple Gourmet apple (circle)

4. Did (you / your child) drink fresh squeezed lemonade?

Y(1) N(0)

DK(9) (circle)

(If YES) ► Can you tell me where you purchased it?

Specify: \_\_\_\_\_

5. Did (you / your child) eat any other foods that were purchased at the fair?

Y(1) N(0) DK(9)

(circle)

(If NO) ► GO TO D-6

(If YES) ► What else did (you/your child) eat while attending the fair? (Ask them to specify the food and which vendor)

Food 1			Location 1		
Food 2			Location 2		
Food 3			Location 3		
Food 4			Location 4		
Food 5			Location 5		
Food 6			Location 6		
Food 7			Location 7		
Food 8			Location 8		

6. Did (you / your child) drink any other beverages purchased at the fair?

Y(1) N(0)

DK(9) (circle)

(If NO) ► GO TO Section E

(If YES) ► What else did (you/your child) drink while attending the fair? (Ask them to specify beverage and which vendor)

Beverage 1			Location 1		
Beverage 2			Location 2		
Beverage 3			Location 3		
Beverage 4			Location 4		

7. Do you smoke or use tobacco products?

Y(1) N(0)

DK(9) (circle)



## SECTION E: Pre-existing medical conditions

*“Now I would like to ask you a few questions about (your / your child’s) health in the month before this illness began. We would like to know about long-standing medical conditions or other specific medical conditions in the three weeks before this illness, which is from \_\_\_ / \_\_\_ / \_\_\_ (4 weeks prior) to \_\_\_ / \_\_\_ / \_\_\_ (ONSET DATE). You do not need to answer the questions if you don’t want to.”*

1. Prior to this illness did (you / your child) have any of the following medical conditions?

**PLEASE READ EACH CONDITION AND RECORD YES / NO / DK**

		Yes	No	DK
<b>A</b>	Diabetes	1	0	9
<b>B</b>	Kidney Disease	1	0	9
	→ <b>IF YES</b> , Are you/your child on dialysis or awaiting dialysis?	1	0	9
<b>C</b>	Organ or Bone Marrow Transplant	1	0	9
<b>D</b>	Leukemia or Cancer	1	0	9
	If Yes ► Treatment with radiation or chemotherapy in previous month?	1	0	9

*“I would now like to ask some questions about medications that (you / your child) may have been taking in the month before (your / your child’s) illness began, which is from \_\_\_ / \_\_\_ / \_\_\_ (4 weeks prior) to \_\_\_ / \_\_\_ / \_\_\_ (ONSET DATE)”*

2. In the **month** before (your/your child’s) illness began, did (you/your child) receive any of the following types of treatments or take any of the following types of medications?

PLEASE READ EACH MEDICATION/TREATMENT		Yes	No	DK
<b>A</b>	Any oral steroid, such as Prednisone?	1	0	9
<b>B</b>	Any immune-suppressing medication, such as to treat juvenile arthritis?	1	0	9
	(If YES) ► Specify:			

3. In the month before (your / your child’s) illness onset, which was \_\_\_ / \_\_\_ / \_\_\_ (ONSET DATE), did (you/your child) take any antibiotics? Y(1) N(0)  
DK(9) (circle)

(If YES) ► It may be helpful to get the pill bottle, do you want to do that now?

- A. What is the name of the antibiotic(s) (you / your child) took?
- B. What date did (you / your child) start taking the antibiotic?
- C. When did (you / your child) stop taking the antibiotic?
- D. Did (you / your child) miss any doses of antibiotics?

A. Antibiotic Name	CODE	B. Start date? (999999=DK)	C. Stop date? (777777= still taking, 999999=DK)	D. Miss any doses?
Ab1:				Y / N / DK
Ab2:				Y / N / DK
Don't Remember	DK			

4. (If child is under 2 years old): Is or was your child breast-fed? Y(1) N(0)  
DK(9) (circle)





## SECTION F: MEDICATIONS AFTER ILLNESS (CASES only)

**The following questions are about medications and medical care that (you / your child) received during the 7 days after this illness started on \_\_\_/\_\_\_/\_\_\_\_\_ (ONSET DATE). I am going to ask about antibiotics and anti-diarrhea medications. It may be helpful to get the bottle, do you want to do that now?**

1. During the first 7 days of this illness, did (you/your child) take any antibiotics, this could be antibiotics taken at home or antibiotics from a medical provider? Y(1)

N(0) DK(9) (circle)

(If YES) ►

A. What is the name of the antibiotic(s) (you / your child) took?

B. What date did (you / your child) start taking the antibiotic?

C. When did (you / your child) stop taking the antibiotic?

D. Did (you / your child) miss any doses of antibiotics?

A. Antibiotic Name	CODE	B. Start date? (999999=DK)	C. Stop date? (777777= still taking, 999999=DK)	D. Miss any doses?
Ab1:				Y / N / DK
Ab2:				Y / N / DK
Don't Remember	DK			

2. Did (you/your child) take any anti-diarrhea medications during the 7 days after this illness began, this could be anti-diarrhea medications taken at home or given by a medical provider? Y(1)

N(0) DK(9) (circle)

(If YES) ► Did (you/your child) take (read each medication)?

(If YES) ► What date did (you / your child) start taking this medication?

When did (you / your child) stop taking this medication?

Anti-diarrheal	B. Start date? (999999=DK)	C. Stop date? (777777= still taking, 999999=DK)
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Pepto-Bismol Y(1) N(0) DK(9) (circle)		
Immodium Y(1) N(0) DK(9) (circle)		
Kaopectate Y(1) N(0) DK(9) (circle)		
Lomotil Y(1) N(0) DK(9) (circle)		
Other anti-diarrhea medication Y(1) N(0) DK(9) (circle)		
(If YES) ► Specify:		

3. How many times did (you / your child) visit a doctor or other health professional for this illness?

Please include emergency room, urgent care, and clinic visits, including follow-up visits. \_\_\_  
visits DK (99)

4. (Were you / Was your child) hospitalized for this illness?

Y(1) N(0)



DK(9) (circle)

(If YES) ►

A. On what date (were you / was your child) first admitted to the hospital for this illness?

\_\_\_\_ / \_\_\_\_ / \_\_\_\_ (mm / dd / yy) DK (999999)

B. How long (were you / was your child) hospitalized? \_\_\_\_\_ (days)

5. (Were you / was your child) treated with intravenous fluids for this illness? Y(1) N(0)  
DK(9) (circle)

### Section G: Knowledge, Attitudes & Beliefs

***“Now I would like to ask you some questions about contact with animals and hand-washing at the fairgrounds.”***

1. When considering attendance at an agricultural fair, like the North Carolina State Fair, how important are exhibits where (you / your child) can have direct contact with animals? (Read choices)

**Very important(1) Important(2) Not very important(3) Not important(4) DK(9)**

2. In general, were members of (your / your child's) household aware that some diseases can be transmitted by having contact with farm animals?

Y(1) N(0) DK(9) (circle)

3. Were hand-washing facilities with running water and soap available to the public at the fair?

Y(1) N(0) DK(9) (circle)

(If YES) ► Where were these facilities located?

In the same area as the animals?

Y(1) N(0) DK(9) (circle)

At the exit of the exhibit?

Y(1) N(0) DK(9) (circle)

Near eating facilities or picnic areas?

Y(1) N(0) DK(9) (circle)

4. Were hand-sanitizing dispensers available to the public at the fair? Y(1) N(0)  
DK(9) (circle)

(If YES) ► Where were these facilities located?

In the same area as the animals?

Y(1) N(0) DK(9) (circle)

At the exit of the exhibit?

Y(1) N(0) DK(9) (circle)

Near eating facilities or picnic areas?

Y(1) N(0) DK(9) (circle)

5. Were hand-washing or hand-sanitizing facilities low to the ground, at child level? Y(1) N(0)  
DK(9) (circle)

6. Were there verbal instructions to wash (your / your child's) hands after coming into contact with farm animals?

Y(1) N(0) DK(9) (circle)

7. Were there posters/signs instructing (you/your child) to wash your hands after coming into contact



with farm animals?

Y(1) N(0) DK(9) (*circle*)

(If YES) ► Were the signs/posters located...

At the entrance to the exhibit or pen?

Y(1) N(0) DK(9) (*circle*)

Inside the exhibit or pen?

Y(1) N(0) DK(9) (*circle*)

At the exit of the exhibit or pen?

Y(1) N(0) DK(9) (*circle*)

8. Were there posters/signs instructing (you/your child) not to eat or drink in the animal areas?

Y(1) N(0)

DK(9) (*circle*)

(If YES) ► Were the signs/posters located...

At the entrance to the exhibit or pen?

Y(1) N(0) DK(9) (*circle*)

Inside the exhibit or pen?

Y(1) N(0) DK(9) (*circle*)

At the exit of the exhibit or pen?

Y(1) N(0) DK(9) (*circle*)

9. Did you notice food or beverages being prepared, served, or consumed in the animal areas?

Y(1) N(0) DK(9) (*circle*)

10. Did you notice animals in areas where food was being prepared, served, or consumed?

Y(1) N(0) DK(9) (*circle*)

11. In general, (do you / does your child) **always(1), almost always(2), sometimes(3), or never(4)**, wash your hands before eating? (*circle answer*)

12. In general, (do you / does your child) **always(1), almost always(2), sometimes(3), or never(4)**, chew on or bite their fingernails? (*circle answer*)

13. Do members of your family carry and use personal hand sanitizers when away from home?

Y(1) N(0) DK(9) (*circle*)

## CLOSING SCRIPT:

Do you have any digital photos of any of the animal areas at the Fair, that you would be willing to share with us, for use in professional public health presentations?

Y(1)

N(0) DK(9) (*circle*)

(If YES) ► Please email them to Stephanie Giese (email provided)

That is the last question. Thank you so much for your time and for answering our questions. We hope that your answers combined with the answers others provide will help us identify what happened and what can be done in the future to prevent similar outbreaks of illness.

Do you have any questions for me?

If you have any additional questions later, please call Stephanie Giese, at the North Carolina General Communicable Disease Control Branch, at 919-XXX-XXXX

